



IN THE U.S. PATENT AND TRADEMARK OFFICE

APPLICANT : ICHIKAWA ET AL.

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EXAMINER: Tom P Duong

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TC 3700 MAIL ROOM

D E C L A R A T I O N

Honorable Commissioner of Patents and Trademarks Washington,
D.C. 20231

Sir,

I, Yasushi ICHIKAWA, resident of c/o Bridgestone Sports Co., Ltd., M&D center Chichibu, 20, Ohnohara, Chichibu-shi, Saitama-ken, Japan do hereby declare that:

1. I was graduated from the Department of Science and Technology of Sophia University, Japan in March 1992. From April 1992 to December 1992, I was employed by Bridgestone Corporation, and in January 1993, I was transferred from Bridgestone Corporation to Bridgestone Sports Co., Ltd., the assignee of the above-identified application. I have been engaged in research and development relating to sporting goods such as golf balls in the laboratory of the Company.

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2. I am one of the named inventors of the above-identified application and I am familiar with the subject matter disclosed in said application.

3. In order to show the feature of the present invention, I conducted the following experiment.

[Experiment]

Invention and Comparison

Referring to FIG. 1 of the present application, there are illustrated three golf balls which were prepared in Invention and Comparison. The three-piece golf ball shown in FIG. 1 consists of a core (a), an intermediate layer 3, and an cover 1.

Core-forming compositions were formulated in accordance with Table 1, milled in a Banbury mixer and conventionally molded at 155°C for 15 minutes, forming cores.

Table 1

	(a)
Core Formulation (pbw)	Polybutadiene BR01
	100
	Zinc diacrylate
	25
	Dicumyl peroxide
	1.2
	Zinc oxide
	5
Physical properties	Barium sulfate
	21.5
	Antioxidant
	0.2
	Peptizer
	0.1
	Diameter (mm)
	35.2
	Hardness (mm)
	3.9
	Weight (g)
	27.1
	Initial velocity @23°C (m/s)
	76.55

Intermediate and cover-forming resin compositions were blended in accordance with Table 2 and compounded on a twin-screw

extruder.

The cover of Comparison was prepared by compounding 100 parts of ionomer resins with 10 parts of millable type silicone rubber. Compounded material was then injection molded on the pre-formed spherical body (core + intermediate layer) to form cover with plurality of dimples on its surface.

The golf balls were tested as follows, with the results also shown in Table 2. Many measurements were made both at room temperature (23°C) and at a low temperature (3°C).

Hardness is a deflection (mm) under an applied load of 100 kg.

Initial velocity was measured at 23°C and 3°C on apparatus approved by USGA.

Flight distance (including carry and total) was determined at 23°C and 3°C by hitting the ball with a driver (#1W) at a head speed (HS) of 45 m/s using a hitting machine by True Temper Co.

Slope is the slope of a correlation line between initial velocities at 23°C and 3°C.

Durability against strikes was determined by repeatedly hitting the ball with a driver (#1W) at a head speed of 40 m/s using a hitting machine by True Temper Co., with the maximum being 300 strikes. In each example, five balls were tested. The number of broken balls and an average of the strikes at which the balls were broken are reported.

Feel was rated at 23°C and 3°C by five low-handicap amateur golfers using a driver, No. 5 iron and putter.

VS: very soft and pleasant

S: soft and good

Av: ordinary

H: hard

Table 2

			Invention	Comparison
Material (pbw)	Core	(Table 1)	a	a
	Intermediate Layer	Hytrel 4047	100	100
	Cover	Himilan 1706	50	50
		Himilan 1605	50	50
		KMP597 (silicone rubber powder)	10	
		TSE 2287U (silicone rubber)		10
		Titanium dioxide	3	3
Structure	Core	Diameter (mm)	35.2	35.2
		Hardness (mm)	3.9	3.9
		Weight (g)	27.1	27.1
		Initial Velocity @23°C (m/s)	76.55	76.55
	Intermediate layer	Outer diameter (mm)	38.7	38.7
		Hardness (mm)	3.7	3.7
		Weight (g)	35.6	35.6
		Initial velocity @23°C (m/s)	75.76	75.76
	Ball (after outer layer molding and painting)	Outer Diameter (mm)	42.7	42.7
		Hardness (mm)	3.3	3.3
		Weight (g)	45.2	45.2
		Initial Velocity @23°C (m/s)	76.84	76.42
		Initial Velocity @3°C (m/s)	75.96	75.51
		Slope	0.0440	0.0445
Flight performance	Distance @23°C, HS 45	Carry (m)	218.6	215.5
		Total (m)	233.5	230.5
	Distance @3°C, HS 45	Carry (m)	213.5	210.0
		Total (m)	227.7	224.0
Durability against strikes	Number of broken balls/test balls		0/5	5/5
	Average of strikes at breakage (300 strikes at maximum)		not broken	110
Feel @23°C	Putter		VS	VS
	Iron		VS	VS
	Driver		VS	VS
Feel @3°C	Putter		VS	VS
	Iron		VS	VS
	Driver		VS	VS

The components in Tables 1 and 2 are shown below.

BR01: polybutadiene rubber by JSR

Hytrel 4047: polyester elastomer, Shore D hardness 40, by Dupont-Toray K.K.

Himilan 1706: Zn-neutralized ionomer resin, acid content 15%, Shore D hardness 62, by Dupont-Mitsui Polychemical K.K.

Himilan 1605: Na-neutralized ionomer resin, acid content 15%, Shore D hardness 62, (by Dupont-Mitsui Polychemical K.K.

KMP597: silicone rubber powder, spherical, mean particle size 5 μ m, particle size distribution 1-10 μ m, true specific gravity 0.97, water content 0.1%, by Shin-Etsu Chemical Co., Ltd.

TSE 2287U: millable type silicone rubber, JIS-A hardness 80, by Toshiba Silicone K.K.

As seen from Table 2, the three-piece golf ball of Invention in which a silicone rubber powder was added to the cover were superior in durable against consecutive strikes, a satisfactory feel and rebound even at low temperature. On the other hand, the three-piece golf ball of Comparison in which a silicone rubber was added to the cover was inferior to Invention in the durable against consecutive strikes and the rebound even at low temperature.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated this 10th day of December, 2002

Yasushi Ichikawa